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### **Remarks/Arguments**

#### **Claims under Prosecution**

Independent claim 22 and claims 25, 33, and 36-38, directly or indirectly dependent thereon, are in the application. Independent claim 22 is drawn to a non-aqueous lithium secondary battery. The battery comprises a positive electrode, a negative electrode, a microporous polymer film separator between the electrodes, and a nonaqueous electrolyte solution comprising a nonaqueous solvent and a lithium salt as defined by the claim. The negative electrode comprises ceramic particles as defined by the claim. For the specific limitations, attention is directed to the listing of claims, which may be found in the paper filed September 24, 2003.

#### **Rejection under 35 USC 102**

Claims 22, 25, 33, and 36-38 were rejected as anticipated by the JAPIO English language Abstract and the computer generated English language translation of JP 8-298121 (JP '121). This rejection is respectfully traversed. In the following discussion, reference will be made to the JAPIO English language Abstract and the computer generated English language translation of JP '121 provided by the Patent Office.

In JP 8-298121 conductive particles are added to the positive electrode and/or the negative electrode of a nonaqueous secondary battery. See, Abstract, Purpose, Claim 1, ¶ 9, and ¶ 58.

Applicants' claims recite that the negative electrode "comprises ceramic particles not relating to the charge and discharge reactions of the battery." Further, the claims recite that "the ceramic particles are Al<sub>2</sub>O<sub>3</sub> particles." The particles are

ceramic particles, not carbon/ceramic composite materials. Ceramics are non-conductive. See, McGraw-Hill Concise Encyclopedia of Science and Technology, McGraw-Hill, New York, 1984, "Ceramics," p. 319 ("In general, ceramics are hard, brittle, electrical and thermal insulators, require high-temperature processing, and are formed from powders.) (emphasis added). It is well known that aluminum oxide is non-conductive. See, for example, The Merck Index, Merck & Co., Whitehouse Station, N.J., 13<sup>th</sup> Ed., 2001, p. 63, which indicates that aluminum oxide is an electrical insulator. Copies of these references are enclosed.

Anticipation requires that each and every limitation of the claim be disclosed, either expressly or under principles of inherency, in a single prior art reference. *In re Robertson*, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999). Absence from the reference of any claimed limitation negates anticipation. *Rowe v. Dror*, 42 USPQ2d 1550, 1553 (Fed. Cir. 1997). The reference expressly discloses carbon/ceramic particles. The reference expressly discloses conductive particles. As noted above, the claims generally recite a lithium battery in which the negative electrode comprises 5 to 20 parts by weight of ceramic particles in 100 parts by weight of the active substance of aluminum oxide particles that have particle size of 1 micron or less. Both "ceramic particles" and "aluminum oxide particles" are non-conductive. Therefore, the rejection of claims 22, 25, 33, and 36-38 as anticipated by the JAPIO English language Abstract and the computer generated English language translation of JP 8-298121 should be withdrawn.

## **Conclusion**

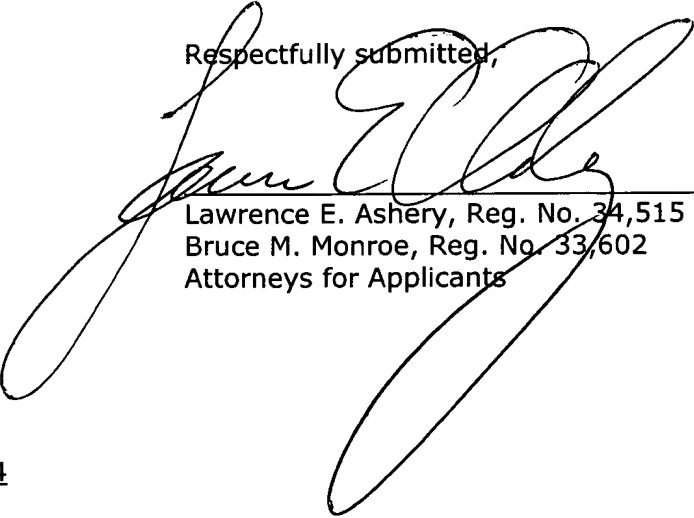
It is respectfully submitted that the claims are in condition for immediate allowance and a notice to this effect is earnestly solicited. The Examiner is invited to

Appln. No.: 09/042,681  
Response Dated: August 5, 2004  
Reply to Final Office Action of: May 20, 2004

MAT-5870

phone applicants' attorney if it is believed that a telephonic or personal interview would expedite prosecution of the application.

Respectfully submitted,



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BMM/bmm/fp

Enclosures: 2 references

Dated: August 5, 2004

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highly polymerized and be completely removed. s; reducing agent. Lith-  
il reagent because of its

21645-51-2] Aluminum  
alumina.  $\text{Al}_2\text{O}_3$ ; mol  
wt 101.96.  $\text{Al}(\text{OH})_3$ . Prepn  
him. [12], 5, 106 (1950);  
A. 44, 965f (1950); Gme-  
l-132 (1934); Becher in  
Chemistry, vol. 1, G.  
k, 2nd ed., 1963 pp 820-  
1652-1654. Comparative  
acids: F. W. Green, Jr. et  
75). Clinical comparison  
s; binder in chronic renal  
Med. J. 291, 623 (1985).  
V. Nicklas, Res. Immunol.

amorphous powder. Prac-  
ne aq solns or in  $\text{HCl}$ ,  $\text{H}_2$ -  
nce of some water. Forms  
Absorbs acids,  $\text{CO}_2$ .  
x; ALternaGEL; Aludyal;  
acid. White, viscous sus-  
ied gel.  
exchanger; in chromatog-  
medium; manuf glass, fire  
bricating compositions, de-  
antiperspirants, dentifrices.  
phosphatemic.

loride. [1327-41-9] Basic  
alorohydroxide; aluminum  
rol; Locron; Phosphonorm.  
rmula is  $\text{Al}_2(\text{OH})_5\text{Cl} \cdot 2\text{H}_2\text{O}$ .  
table Al salts: FR 837862  
G. Farben.); H. Huehn, W.  
sen, US 2492085 (1949 to  
s and physicochemical prop-  
Pharm. Sci. 70, 758, 762  
y and use in hyperphospha-  
-Pharma), C.A. 99, 110747a

, forming slightly turbid col-  
of 15% aq soln ~4.3.

perphosphatemic.

phite. [7784-22-7]  $\text{AlH}_2\text{O}_6$ -  
2.72%, O 43.25%, P 41.87%.  
 $\text{OH}$ ), or a solution of an alu-  
is acid or sodium hypophos-  
2, 2945.

hout melting at ~220° with  
y insol in water. Sol in warm  
dilute or concd hydrochloric

fiber finishes.

[7784-23-8]  $\text{AlI}_3$ ; mol wt  
pn from aluminum and iodine:  
53); H. J. Becher in Handbook  
try vol. 1, G. Brauer, Ed. (Ac-  
1963) p 814; Wilson, Worrall,

mercial grade yellowish- to  
; bp 382°;  $d_4^{17}$  3.948. Fumes in  
ction with water. Keep tightly  
sol in carbon disulfide, alcohol,

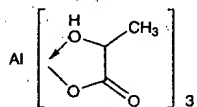
liquesce cryst powder. Sol in  
ity closed.  
tions.

346. Aluminum Isopropoxide. [555-31-7] 2-Propanol  
aluminum salt; aluminum isopropylate.  $\text{C}_9\text{H}_{21}\text{AlO}_3$ ; mol wt  
204.24. C 52.93%, H 10.36%, Al 13.21%, O 23.50%.  $\text{Al}$ -  
[ $\text{OCH}(\text{CH}_3)_2$ ]<sub>3</sub>. Prepd from aluminum and isopropyl alcohol in  
the presence of mercuric chloride: Young et al., J. Am. Chem.  
Soc. 58, 100 (1936); by adding excess isopropyl alcohol to a  
benzene soln of  $\text{AlCl}_3$  at 6°: Teichner, Compt. Rend. 237, 810  
(1953). Forms trimers and tetramers: Shiner et al., J. Am.  
Chem. Soc. 85, 2318 (1963); Oliver et al., J. Inorg. Nucl. Chem.  
31, 1609 (1969); Worrall, J. Chem. Ed. 46, 510 (1969). Toxic-  
ity: Smyth et al., Am. Ind. Hyg. Assoc. J. 30, 470 (1969).  
Review: Whitaker, Advan. Chem. Series 23, 184-189 (1959).

Hygroscopic white solid, mp 119°. Solidifies rather slowly  
after distillation. bp<sub>10</sub> 135°; bp<sub>7.5</sub> 131°; bp<sub>3.5</sub> 125.5°; bp<sub>2.5</sub> 113°;  
bp<sub>1.5</sub> 106°; bp<sub>0.5</sub> 94°. Sol in ethanol, isopropanol, benzene, tol-  
uene, chloroform, carbon tetrachloride, petroleum hydrocar-  
bons. Decomposed by water. LD<sub>50</sub> orally in rats: 11.3 g/kg  
(Smyth).

USE: Meerwein-Ponndorf reactions; alcoholysis and ester  
exchange; synthesis of higher alkoxides, chelates, and acylates;  
formation of aluminum soaps, formulation of paints, waterproof-  
ing finishes for textiles.

347. Aluminum Lactate. [18917-91-4] Aluetyl.  $\text{C}_9\text{H}_{15}\text{AlO}_5$ ;  
mol wt 294.19. C 36.74%, H 5.14%, Al 9.17%, O 48.95%.  
Prepn from lactic acid and aluminum isopropoxide or  
aluminum chloride: Rai et al., J. Prakt. Chem. 20, 105 (1963);  
from lactic acid and aluminum foil: Jones, Cluskey, Cereal  
Chem. 40, 589 (1963).



Powder. Freely sol in water.

USE: In foam fire-extinguishers; in dental-impression mate-  
rials.

THERAP CAT: Antiseptic.

348. Aluminum Lithium Hydride. [16853-85-3] Lith-  
ium tetrahydroaluminate; lithium aluminum hydride; lithium alu-  
minohydride; lithium alane.  $\text{AlH}_2\text{Li}$ ; mol wt 37.96. Al  
71.08%, H 10.62%, Li 18.29%.  $\text{LiAlH}_4$ . Prepd by treating lith-  
ium hydride with an ether soln of  $\text{AlCl}_3$ : Finholt, et al., J. Am.  
Chem. Soc. 69, 1199 (1947). Crystal structure: Sklar, Post, In-  
org. Chem. 6, 669 (1967). Review of chemistry: J. S. Pizey,  
Synthetic Reagents, Vol. 1 (John Wiley, New York, 1974) pp  
101-294.

Microcrystalline white powder when pure; gray when alu-  
minum impurity present. Monoclinic crystals.  $d$  0.92. Stable  
in dry air at room temperature, decomp above 125°, slowly loses  
hydrogen at 120°, decomp in moist air, may ignite on grinding  
in air. Soly (parts/100 parts solvent): 30 (ether); 13 (tetrahy-  
drofuran); 10 (dimethylcellosolve); 2 (dibutyl ether); 0.1 (di-  
oxane). Reacts rapidly with water and alcohols; reduces alde-  
hydes, ketones, acid chlorides and esters to alcohols; nitriles to  
amines; aromatic nitro compounds to azo compounds. Does not  
attack olefinic double bonds unless they are conjugated with a  
phenyl group and a carbonyl or nitrile group.

USE: Reducing agent; in preparation of other hydrides.

349. Aluminum Magnesium Silicate. [12511-31-8]  
Magnesium aluminum silicate.  $\text{Al}_2\text{MgO}_5\text{Si}_2$ ; mol wt 262.43.  
Al 20.56%, Mg 9.26%, O 48.77%, Si 21.40%.  $\text{MgAl}_2(\text{SiO}_4)_2$ .  
Occurs in nature in the minerals: *colerainite*, *leuchtenbergite*,  
*pyrope*, *saponite*, *sapphirine*, *sheridanite*, *zebedassite*. Prepn:  
GB 834517 (1960 to Fuji Chem.)

Hydrate. Ervasil.

USE: As suspending agent, thickening agent.

THERAP CAT: Antacid.

350. Aluminum Nicotinate. Nicalex. Pharmaceutical  
composition consisting of aluminum hydroxydinicotinate and  
nicotinic acid. Manufacturing process: J. P. Miale, US 2970082

(1961 to Walker Labs.). Prepn, properties and clinical studies:  
idem, Curr. Ther. Res. 7, 392 (1965). Clinical trial in hyper-  
cholesterolemia: E. S. McCabe, Del. Med. J. 38, 49 (1966).

White, amorphous powder with very slight acidulous taste.  
Insol in water, alcohol. Sol in diluted mineral acids.

THERAP CAT: Has been used as antihyperlipoproteinemic.

351. Aluminum Nitrate. [13473-90-0]  $\text{AlN}_3\text{O}_9$ ; mol wt  
213.00. Al 12.67%, N 19.73%, O 67.60%.  $\text{Al}(\text{NO}_3)_3$ . Occurs  
in several states of hydration of which the nonahydrate is the  
most stable. Prepn: Gmelin's, Aluminum (8th ed.) 35B, p 149-  
152 (1934). Toxicity data: Smyth et al., Am. Ind. Hyg. Assoc.  
J. 30, 470 (1969).

Nonahydrate. Deliquesce crystals; mp 73°; dec at 135°.  
Very sol in water, alc; very slightly sol in acetone. Almost insol  
in ethyl acetate and pyridine. The aq soln is acid. Keep well  
closed. LD<sub>50</sub> orally in rats: 4.28 g/kg (Smyth).

USE: Tanning leather; antiperspirant; corrosion inhibitor; ex-  
traction of uranium; nitrating agent.

352. Aluminum Nitride. [24304-00-5]  $\text{AlN}$ ; mol wt  
40.99. Al 65.82%, N 34.17%. Prepd commercially by heating  
bauxite and coal in a stream of nitrogen. Laboratory prepn from  
powdered aluminum metal: Becher in Handbook of Preparative  
Inorganic Chemistry Vol. 1, G. Brauer, Ed. (Academic Press,  
New York, 2nd ed., 1963) p 827.

Orthorhombic or hexagonal, bluish-white crystals. In moist  
air, odor of ammonia.  $d_4^{25}$  3.05. Hardness no: 9 to 10 on  
Mohs' scale. mp 2150-2200° at 4.3 atm. Spec heat at 0°: 0.180  
cal/g°C; at 100°: 0.207 cal/g°C; at 500°: 0.313 cal/g°C.  
Heat of formation: -74 kcal/mol. Decomposed by water into  
 $\text{Al}(\text{OH})_3$  and  $\text{NH}_3$ .

USE: In semiconductor electronics; in steel manuf.

353. Aluminum Oleate. [688-37-9] 9-Octadecenoic  
acid aluminum salt; oleic acid aluminum salt.  $\text{C}_{54}\text{H}_{99}\text{AlO}_6$ ; mol  
wt 871.34. C 74.43%, H 11.45%, Al 3.10%, O 11.02%.  $[\text{CH}_2$ -  
 $(\text{CH}_2)_7\text{CH}=\text{CH}(\text{CH}_2)_7\text{COO}]_3\text{Al}$ . Prepd from freshly pptd  $\text{Al}_2$ -  
 $(\text{OH})_6$  and oleic acid: Stich, Pharm. Zentralhalle. 63, 261  
(1922), C.A. 16, 2755 (1922).

Yellowish, viscid mass. Practically insol in water. Sol in al-  
cohol, benzene, ether, oil turpentine.

USE: In oil or turpentine soln as lacquer for metals, as size,  
waterproofing agent, drier, for paints, high-pressure and high-  
temp greases for thickening lubricating oils.

354. Aluminum Oxalate. [814-87-9]  $\text{C}_6\text{Al}_2\text{O}_{12}$ ; mol wt  
318.02. C 22.66%, Al 16.97%, O 60.37%.  $\text{Al}_2(\text{C}_2\text{O}_4)_3$ . Prepn:  
GB 348789 and GB 348790 (both 1930 to I.G. Farben).

Hydrate. Powder. Practically insol in water, alc. Sol in  
mineral acids.

USE: Mordant in printing textiles, dyeing cotton.

355. Aluminum Oxide. [1344-28-1] Alumina.  $\text{Al}_2\text{O}_3$ ;  
mol wt 101.96. Al 52.93%, O 47.08%. Occurs in nature as the  
minerals: *bauxite*, *bayerite*, *boehmite*, *corundum*, *diaspore*,  
*gibbsite*. Prepn and properties: Mellor's vol. V, 263-273  
(1929); Gmelin's, Aluminum (8th ed.) 35B, pp 7-98 (1934);  
Becher in Handbook of Preparative Inorganic Chemistry vol.  
1, G. Brauer, Ed. (Academic Press, New York, 2nd ed.; 1963)  
pp 822-823; Wagner, *ibid.* vol. 2 (1965) pp 1660-1663. Use as  
column matrix in ion chromatography: W. Buchberger, K. Win-  
sauer, J. Chromatog. 482, 401 (1989); in HPLC: M. T. Kelly,  
M. R. Smyth, J. Pharm. Biomed. Anal. 7, 1757 (1989). Clinical  
evaluation in hip replacement: L. Sedel et al., J. Bone Joint  
Surg. [Brit.] 72-B, 658 (1990); of wear in hip replacement: L.  
P. Zichner, H.-G. Willert, Clin. Ortho. Rel. Res. 282, 86 (1992).  
Review of properties, biocompatibility and clinical use: P. Bou-  
tin et al., J. Biomed. Mat. Res. 22, 1203-1232 (1988); of bio-  
compatibility: P. S. Christel, Clin. Ortho. Rel. Res. 282, 10-18  
(1992).

Approximate characteristics of native aluminum oxide:  
White cryst powder. Very hard, about 8.8 on Moh's scale. An  
electrical insulator; electrical resistivity at 300° about  $1.2 \times 10^{13}$   
ohm-cm. When heated above 800° it becomes insol in acid and  
specific gravity increases from 2.8 to 4.0. Insol in water. Very  
hygroscopic.

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ward and surrounds the mouth and is subdivided into eight or more appendages which sometimes are contractile, and in all but *Nautilus* are provided with suckers. As a result of the forward movement of the foot, the digestive tract is U-shaped and the viscera form a hump contained within a fleshy mantle in which the gills are also suspended. Fins are found in widely divergent forms, but the main means of locomotion is the funnel, found beneath the head. During rapid movement, water enters the mantle cavity and is violently ejected through the funnel, the animal moving posteriorly from the force of the jet.

Cephalopods feed voraciously upon crustaceans and larval and adult fish, and cannibalistically upon their own kind. Food is obtained by darting out the tentacles or arms and seizing the prey with suckers or, in some squids, with the clawlike hooks.

Cephalopods are numerous in the sea, particularly in the bathypelagic regions, where they occur in vast shoals. They form the most important part of the diet of the sperm whales and are the sole food of many of the smaller toothed whales, as well as a major item of food for the larger pelagic fishes. They are eaten by humans and fished for in many parts of the world. They may represent one of the largest nearly untouched food resources in the sea. See AMMONOIDEA; DECAPODA (MOLLUSCA); DIBRANCHIA; NAUTOLOIDEA; OCTOPODA; OCTOPUS; SQUID; TETRABRANCHIA. [G.L.V.]

**Cepheids** A class of brightness-variable stars whose prototype is the star Delta Cephei in the constellation Cepheus. While both bluer and redder stars also vary in their intrinsic light, the properties of these  $\beta$  Cephei, ZZ Ceti, RV Tauri, and Mira variables are much less understood than the yellow-color Cepheids. These yellow stars are known to be pulsating in radius by as much as 10% or more. Their light variations are due to their changing surface temperature. Larger yellow stars are intrinsically brighter because they have more surface area, and they have larger pulsation periods because they have a larger radius. See STAR; VARIABLE STAR.

The interest in these stars is twofold: If their intrinsic brightnesses can be inferred from their pulsation period, the brightnesses can be used as indicators of their distance from the Earth. The observed period and a calibrated period-luminosity relation is used to give an intrinsic brightness. The observed distance-dependent apparent brightness then gives the actual distance. The second, and more current, interest in Cepheids is that their pulsation properties reveal their masses and internal structure, which help in understanding how stars age. Thus, Cepheids and the related classes of yellow pulsating stars have been extremely useful in mapping the scale of the universe and in probing the details of stellar interiors. See STELLAR EVOLUTION. [A.N.Co.]

**Ceractinomorpha** A subclass of Demospongiae. Among the Ceractinomorpha, the genus *Halisarca*, lacking skeletal elements, is a primitive form. The larva of *Halisarca* is a diploblastula or parenchymella with an outer layer of flagellated cells and an inner mass of presumptive ectomesenchymal cells. The outer flagellated cells lose their flagella, migrate into the interior, and later differentiate into choanocytes. Other cell types characteristic of the adult sponge differentiate, and inhalant canals begin to form.

In form, ceractinomorph sponges vary from encrustations, thin or massive, to lobate and upright branching colonies. The shallow-water species tend to be more plastic in form than deep-water species, which usually exhibit little intraspecific variation in shape. See DEMOSPONGIAE; PORIFERA. [W.D.H.]

**Ceramics** The application of the findings of science and engineering to the production of useful products from the non-metallic, inorganic materials. Ceramics are materials which

cover a great range in both applications and time. In general, ceramics are hard, brittle, electrical and thermal insulators, require high-temperature processing, and are formed from powders. The major divisions of ceramic technology are similar in processing and in the properties of the materials. However, differences in applications and differences in the behavior of materials during processing require that diverse techniques be used. See CERMET; COMPOSITE MATERIALS; SINTERING.

It is convenient to divide ceramic products into two groups: those, such as pottery and brick, which are shaped or formed before high-temperature treatment, and those, such as glass and cement, which are shaped afterward. Only the first group is discussed in this article. See CEMENT; GLASS; MORTAR; PLASTER.

Structural clay is one of the oldest branches of ceramics and includes building brick, sewer pipe, and decorative ceramic block for walls. To form these products from raw clays, use is made of the plastic forming technique known as extrusion. Extrusion is carried out by forcing a stiff plastic mass through an opening or die in the form of the desired cross section; the continuous ribbon which emerges is cut to the desired lengths. Drying is carried out in conditions of controlled humidity and temperature which prevent the ware from cracking or warping. The dried material is hard and can be broken with hand pressure. After drying, the material is heat-treated to a temperature where the clay is broken up into less complicated molecular structural units. The resulting material is now held together by chemical bonds between glass and oxide compounds, resulting in a hard, brittle material which is resistant to corrosion. This process is known as vitrification. See CLAY.

There are two major divisions of whiteware: art ware and consumer ware (tableware, portable lamps, sanitary ware, and so on). To form these products, powders of clay, potter's flint, and feldspar are used. The clay, when sufficiently wet, imparts plasticity or workability to the body. The forming methods used for consumer whiteware production are slip casting and jiggering. Jiggering is a mechanization of the forming process of throwing clay by hand as done by the potter. For large items such as sanitary ware, artware, and portable lamps, slip casting is most often used. Slip casting of clays is done by pouring a water suspension of the body (a slip) into a plaster of paris mold of the desired shape. The porous plaster mold withdraws water from the slip, which results in a buildup of a layer of solid clay next to the mold. Once the materials have been formed into the desired shape, drying and firing are carried out. See POTTERY.

Properties that make ceramic products desirable in electrical applications are high resistivity, high dielectric strength, low dielectric loss factor, high dielectric constant, and controllable magnetic properties. The ceramic products used in the electrical industry include porcelains, glasses, steatites, cordierites, titanates, zirconates, carbides, oxides, and ferrites. Ceramic products are used in magnets, electronic tubes, condensers, resistors, transformers, amplifiers, memory devices, transducers, capacitors, and insulators. See FERRITE; PORCELAIN.

Ceramics known as refractories are products which thermally insulate the furnaces that produce steel, aluminum, and other metals. They also insulate the furnaces that produce the steam for the generation of electricity, as well as insulate fireplaces in the homes. The manufacture of refractories is one of the key industries in the United States. See REFRACTORY.

[G.E.S.]

**Cerargyrite** A mineral with composition AgCl. Its structure is that of the isometric NaCl type, but well-formed cubic crystals are rare. The hardness is  $2\frac{1}{2}$  on Mohs scale and specific gravity 5.5. Cerargyrite is colorless to pearl-gray but darkens to violet-brown on exposure to light. It is perfectly sectile and



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